

# SEQUENCE LISTING

<110> Tarczynski, Mitchell C  
Li, Changjiang

<120> Methods and Compositions for Modifying Oil and Protein  
Content in Plants

<130> 5718-113 (35718/236392)

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<150> 60/226,142

<151> 2000-08-18

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<170> PatentIn Ver. 2.1

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gagcacgggg acatcaa atg gcg gca gcg gcg gag atc ggt ggt ttc gcg 170

Met Ala Ala Ala Ala Glu Ile Gly Gly Phe Ala

1

5

10

gcg gcg aga gtg gcg gtg gca acg ctc agg ccg gct gcg cac cca gcc 218

Ala Ala Arg Val Ala Val Ala Thr Leu Arg Pro Ala Ala His Pro Ala

15

20

25

ccg gcg gcg gcg gcg gca ccg cag cct agg agg gcg gtg gcg gcg cag 266

Pro Ala Ala Ala Ala Ala Pro Gln Pro Arg Arg Ala Val Ala Ala Gln

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35

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tcg ctg cag acg acc gcc acc gag gcg ctg acg gcg gat ctc gcc ggc 314

Ser Leu Gln Thr Thr Ala Thr Glu Ala Leu Thr Ala Asp Leu Ala Gly

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Thr Thr Asn Gly Ala Val His Ala Arg Met Asn Ser Lys Ala Thr Ser			
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gaa atc act tca cag gca gtt act gca aat tct agg aga aag aca aag			410
Glu Ile Thr Ser Gln Ala Val Thr Ala Asn Ser Arg Arg Lys Thr Lys			
	80	85	90
ata gtc tgc acc ata ggt ccc tca acc aac act cgt gag atg att tgg			458
Ile Val Cys Thr Ile Gly Pro Ser Thr Asn Thr Arg Glu Met Ile Trp			
	95	100	105
aag ctt gca gag act gga atg aat gta gcg cgc ctt aat atg tcc cat			506
Lys Leu Ala Glu Thr Gly Met Asn Val Ala Arg Leu Asn Met Ser His			
	110	115	120
ggt gac cac cag tcg cac cag aag gtt att gat ttg gtc aag gag tac			554
Gly Asp His Gln Ser His Gln Lys Val Ile Asp Leu Val Lys Glu Tyr			
	125	130	135
aat gca cag aac act gat ggc aat gtt att gcc att atg ctg gac aca			602
Asn Ala Gln Asn Thr Asp Gly Asn Val Ile Ala Ile Met Leu Asp Thr			
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Lys Gly Pro Glu Val Arg Ser Gly Asp Val Pro Glu Pro Ile Met Leu			
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aag gaa ggt caa gag ttc aac ttc acg att aaa aga ggg gtg agc act			698
Lys Glu Gly Gln Glu Phe Asn Phe Thr Ile Lys Arg Gly Val Ser Thr			
	175	180	185
gaa gac act gtc agc gtg aac tat gat gac ttc ata aat gat gtt gaa			746
Glu Asp Thr Val Ser Val Asn Tyr Asp Asp Phe Ile Asn Asp Val Glu			
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gct ggc gac ata cta tta gtg gat gga gga atg atg tcg ctt gct gtg			794
Ala Gly Asp Ile Leu Leu Val Asp Gly Gly Met Met Ser Leu Ala Val			
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aag tct aaa aca gcc gat aca gtc aag tgt aaa gta gtt gat ggt ggg			842
Lys Ser Lys Thr Ala Asp Thr Val Lys Cys Lys Val Val Asp Gly Gly			
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gaa ttg aaa tca cgg cgc cac cta aat gtc cgt gga aag agt gct act			890
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255	260	265	
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Glu Asn Gly Val Asp Phe Tyr Ala Val Ser Phe Val Lys Asp Ala Lys			
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Val Ile His Glu Leu Lys Asp Tyr Leu Lys Ser Ala Asn Ala Asp Ile			
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His Val Ile Pro Lys Ile Glu Ser Ala Asp Ser Ile Pro Asn Leu Gln			
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tcc att att gct gct tca gat ggg gca atg gtg gcg cgt gga gac ctt			1130
Ser Ile Ile Ala Ala Ser Asp Gly Ala Met Val Ala Arg Gly Asp Leu			
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Gly Ala Glu Leu Pro Ile Glu Asp Val Pro Leu Leu Gln Ala Glu Ile			
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Val Gln Thr Cys Arg Ser Met Glu Lys Pro Val Ile Val Ala Thr Asn			
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Ser Asp Ile Ala Ile Ala Val Arg Glu Gly Ala Asp Ala Ile Met Leu			
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Ser Gly Glu Thr Ala His Gly Lys Tyr Pro Leu Lys Ala Val Lys Val			
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Met His Thr Val Ala Leu Arg Thr Glu Ser Ser Leu Tyr Asn Pro Thr			
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Phe Ser Ala Ser Gln Leu Ser Lys Met Phe Gly Ser His Ala Thr Met			
445	450	455	
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Met Ala Asn Thr Leu Arg Thr Pro Ile Ile Val Phe Thr Gln Thr Gly			
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tcc atg gct gtc ctc ctg agc cac tat cgt ccc tcg tct aca cta ttt			1610
Ser Met Ala Val Leu Leu Ser His Tyr Arg Pro Ser Ser Thr Leu Phe			
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gca ttt aca aac gag gaa cga gtg aag caa cgg cta gca ctc tac cag			1658
Ala Phe Thr Asn Glu Glu Arg Val Lys Gln Arg Leu Ala Leu Tyr Gln			
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Gly Val Ile Pro Ile His Met Gln Phe Ser Asp Asp Ala Glu Glu Thr			
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ttc tcc aga gca att agc agc ttg ctg aaa gca caa tat gtg aag aag			1754
Phe Ser Arg Ala Ile Ser Ser Leu Leu Lys Ala Gln Tyr Val Lys Lys			
	525	530	535
gga gac tac gtc act ctt gtt cag agc gga gtg act tca atc tgg aga			1802
Gly Asp Tyr Val Thr Leu Val Gln Ser Gly Val Thr Ser Ile Trp Arg			
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gag gaa tcc act cac cac atc caa gtg agg aaa gtt cag gtc			1844
Glu Glu Ser Thr His His Ile Gln Val Arg Lys Val Gln Val			
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catcattata tgtgtaattt tactgtttta ccaggagatt gctacgtcga gttatatgtt			1964
gtgtcgaatt cacgtgtagg ctctgaatct tgactgtgtt cgttcatttt cgcttgtttc			2024
acactgaagt gttataagct caactttact gcttttgttt tcttgtgaaa cttgagttta			2084
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Ala Thr Glu Ala Leu Thr Ala Asp Leu Ala Gly Thr Thr Asn Gly Ala  
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 65 70 75 80

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Gly Pro Ser Thr Asn Thr Arg Glu Met Ile Trp Lys Leu Ala Glu Thr  
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Gly Met Asn Val Ala Arg Leu Asn Met Ser His Gly Asp His Gln Ser  
 115 120 125

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 130 135 140

Asp Gly Asn Val Ile Ala Ile Met Leu Asp Thr Lys Gly Pro Glu Val  
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Leu Val Asp Gly Gly Met Met Ser Leu Ala Val Lys Ser Lys Thr Ala  
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Glu	Lys	Asp	Trp	Glu	Asp	Ile	Lys	Phe	Gly	Val	Glu	Asn	Gly	Val	Asp	260	265	270	
Phe	Tyr	Ala	Val	Ser	Phe	Val	Lys	Asp	Ala	Lys	Val	Ile	His	Glu	Leu	275	280	285	
Lys	Asp	Tyr	Leu	Lys	Ser	Ala	Asn	Ala	Asp	Ile	His	Val	Ile	Pro	Lys	290	295	300	
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Ser	Asp	Gly	Ala	Met	Val	Ala	Arg	Gly	Asp	Leu	Gly	Ala	Glu	Leu	Pro	325	330	335	
Ile	Glu	Asp	Val	Pro	Leu	Leu	Gln	Ala	Glu	Ile	Val	Gln	Thr	Cys	Arg	340	345	350	
Ser	Met	Glu	Lys	Pro	Val	Ile	Val	Ala	Thr	Asn	Met	Leu	Glu	Ser	Met	355	360	365	
Ile	Asp	His	Pro	Thr	Pro	Thr	Arg	Ala	Glu	Val	Ser	Asp	Ile	Ala	Ile	370	375	380	
Ala	Val	Arg	Glu	Gly	Ala	Asp	Ala	Ile	Met	Leu	Ser	Gly	Glu	Thr	Ala	385	390	395	400
His	Gly	Lys	Tyr	Pro	Leu	Lys	Ala	Val	Lys	Val	Met	His	Thr	Val	Ala	405	410	415	
Leu	Arg	Thr	Glu	Ser	Ser	Leu	Tyr	Asn	Pro	Thr	Thr	Ser	Pro	Ser	Leu	420	425	430	
Val	Ala	Ser	Ala	Gln	Gly	Leu	Gln	Asn	Glu	Asp	Phe	Ser	Ala	Ser	Gln	435	440	445	
Leu	Ser	Lys	Met	Phe	Gly	Ser	His	Ala	Thr	Met	Met	Ala	Asn	Thr	Leu	450	455	460	
Arg	Thr	Pro	Ile	Ile	Val	Phe	Thr	Gln	Thr	Gly	Ser	Met	Ala	Val	Leu	465	470	475	480

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Glu Arg Val Lys Gln Arg Leu Ala Leu Tyr Gln Gly Val Ile Pro Ile  
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His Met Gln Phe Ser Asp Asp Ala Glu Glu Thr Phe Ser Arg Ala Ile  
515 520 525

Ser Ser Leu Leu Lys Ala Gln Tyr Val Lys Lys Gly Asp Tyr Val Thr  
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His Ile Gln Val Arg Lys Val Gln Val  
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Met Ala Ala Gly Gly Glu Leu Ala Trp

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ggg gag gag ccc gtg gcg cgg cgc cgg cct aag acc aag atc gtc tgc 222

Gly Glu Glu Pro Val Ala Arg Arg Arg Pro Lys Thr Lys Ile Val Cys

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15

20

25

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Thr Leu Gly Pro Ala Ser Arg Ser Val Glu Met Ile Ser Arg Leu Leu

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cgc gcc ggg atg tgc gtc gcg cgc ttc aac ttc tcc cat ggc tcc cac 318



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gag	tac	cac	cag	gag	acg	ctc	gac	aac	ctg	cac	gcc	gcc	atg	gag	ctc	366
Glu	Tyr	His	Gln	Glu	Thr	Leu	Asp	Asn	Leu	His	Ala	Ala	Met	Glu	Leu	
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Thr	Gly	Ile	Leu	Cys	Ala	Val	Met	Leu	Asp	Thr	Lys	Gly	Pro	Glu	Ile	
	75					80					85					
aga	act	gga	ttt	ttg	aaa	gat	ggg	aag	cct	att	caa	ttg	ata	aaa	ggc	462
Arg	Thr	Gly	Phe	Leu	Lys	Asp	Gly	Lys	Pro	Ile	Gln	Leu	Ile	Lys	Gly	
90					95					100					105	
caa	gaa	atc	aca	att	tct	aca	gac	tat	agc	att	cag	ggt	gat	gag	aaa	510
Gln	Glu	Ile	Thr	Ile	Ser	Thr	Asp	Tyr	Ser	Ile	Gln	Gly	Asp	Glu	Lys	
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atg	ata	tca	atg	agc	tac	aag	aag	ctt	gct	ggt	gat	ctg	aag	cca	ggc	558
Met	Ile	Ser	Met	Ser	Tyr	Lys	Lys	Leu	Ala	Val	Asp	Leu	Lys	Pro	Gly	
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agt	gtc	ata	ttg	tgt	gct	gat	ggt	acc	atc	act	ctt	act	ggt	ctt	cac	606
Ser	Val	Ile	Leu	Cys	Ala	Asp	Gly	Thr	Ile	Thr	Leu	Thr	Val	Leu	His	
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tgt	gat	aaa	gaa	caa	ggc	ttg	ggt	cgc	tgc	cgc	tgt	gag	aac	act	ttc	654
Cys	Asp	Lys	Glu	Gln	Gly	Leu	Val	Arg	Cys	Arg	Cys	Glu	Asn	Thr	Phe	
	155					160					165					
aag	ctt	ggc	gag	agg	aag	aat	ggt	aat	ctt	cca	gga	ggt	att	ggt	gat	702
Lys	Leu	Gly	Glu	Arg	Lys	Asn	Val	Asn	Leu	Pro	Gly	Val	Ile	Val	Asp	
170					175					180					185	
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Leu	Pro	Thr	Leu	Thr	Asp	Lys	Asp	Lys	Glu	Asp	Ile	Leu	Lys	Trp	Gly	
				190					195					200		
ggt	cca	aac	aag	att	gac	atg	att	gcc	ttg	tca	ttt	ggt	cgg	aag	ggt	798
Val	Pro	Asn	Lys	Ile	Asp	Met	Ile	Ala	Leu	Ser	Phe	Val	Arg	Lys	Gly	
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tcg	gat	ctt	gtg	gag	ggt	agg	aag	gta	ctt	ggt	gag	cat	gcc	aag	tcc	846
Ser	Asp	Leu	Val	Glu	Val	Arg	Lys	Val	Leu	Gly	Glu	His	Ala	Lys	Ser	
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ata	atg	ctg	atg	tca	aag	ggt	gag	aat	caa	gag	gga	gta	gct	aac	ttt	894



Ile	Met	Leu	Met	Ser	Lys	Val	Glu	Asn	Gln	Glu	Gly	Val	Ala	Asn	Phe	
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Asp	Asp	Ile	Leu	Ala	Asn	Ser	Asp	Ala	Phe	Met	Val	Ala	Arg	Gly	Asp	
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Gln	Met	Leu	Glu	Ser	Met	Ile	Lys	Ser	Pro	Arg	Pro	Thr	Arg	Ala	Glu	
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Ala	Thr	Asp	Val	Ala	Asn	Ala	Val	Leu	Asp	Gly	Thr	Asp	Cys	Val	Met	
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Leu	Ser	Gly	Glu	Thr	Ala	Ala	Gly	Ala	Tyr	Pro	Gly	Leu	Ala	Val	Gln	
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Thr	Met	Ala	Lys	Ile	Cys	Leu	Gln	Ala	Glu	Ser	Cys	Val	Asp	His	Ala	
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gct	att	ttc	aaa	tca	atc	atg	gct	tca	gct	cca	att	cca	atg	agt	cca	1278
Ala	Ile	Phe	Lys	Ser	Ile	Met	Ala	Ser	Ala	Pro	Ile	Pro	Met	Ser	Pro	
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Leu	Glu	Ser	Leu	Ala	Ser	Ser	Ala	Val	Arg	Thr	Ala	Asn	Ser	Ala	Arg	
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Ala	Ala	Leu	Ile	Leu	Val	Leu	Thr	Arg	Gly	Gly	Thr	Thr	Ala	Arg	Leu	
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Val	Ala	Lys	Tyr	Arg	Pro	Ser	Met	Pro	Ile	Leu	Ser	Val	Val	Val	Pro	
410					415					420					425	
gag	ctg	aag	aca	gac	tcg	ttc	gac	tgg	gcc	tgc	agt	gac	gag	ggt	ccg	1470

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 Ala Thr Ala Lys Ala Phe Asp Asn Glu Ala Thr Asp Glu Ala Ile Gly  
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 Phe Ala Ile Glu Asn Ala Lys Thr Met Gly Leu Cys Asn Thr Gly Gln  
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 Arg Phe Asn Phe Ser His Gly Ser His Glu Tyr His Gln Glu Thr Leu  
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Asp	Asn	Leu	His	Ala	Ala	Met	Glu	Leu	Thr	Gly	Ile	Leu	Cys	Ala	Val	65	70	75	80
Met	Leu	Asp	Thr	Lys	Gly	Pro	Glu	Ile	Arg	Thr	Gly	Phe	Leu	Lys	Asp	85	90	95	
Gly	Lys	Pro	Ile	Gln	Leu	Ile	Lys	Gly	Gln	Glu	Ile	Thr	Ile	Ser	Thr	100	105	110	
Asp	Tyr	Ser	Ile	Gln	Gly	Asp	Glu	Lys	Met	Ile	Ser	Met	Ser	Tyr	Lys	115	120	125	
Lys	Leu	Ala	Val	Asp	Leu	Lys	Pro	Gly	Ser	Val	Ile	Leu	Cys	Ala	Asp	130	135	140	
Gly	Thr	Ile	Thr	Leu	Thr	Val	Leu	His	Cys	Asp	Lys	Glu	Gln	Gly	Leu	145	150	155	160
Val	Arg	Cys	Arg	Cys	Glu	Asn	Thr	Phe	Lys	Leu	Gly	Glu	Arg	Lys	Asn	165	170	175	
Val	Asn	Leu	Pro	Gly	Val	Ile	Val	Asp	Leu	Pro	Thr	Leu	Thr	Asp	Lys	180	185	190	
Asp	Lys	Glu	Asp	Ile	Leu	Lys	Trp	Gly	Val	Pro	Asn	Lys	Ile	Asp	Met	195	200	205	
Ile	Ala	Leu	Ser	Phe	Val	Arg	Lys	Gly	Ser	Asp	Leu	Val	Glu	Val	Arg	210	215	220	
Lys	Val	Leu	Gly	Glu	His	Ala	Lys	Ser	Ile	Met	Leu	Met	Ser	Lys	Val	225	230	235	240
Glu	Asn	Gln	Glu	Gly	Val	Ala	Asn	Phe	Asp	Asp	Ile	Leu	Ala	Asn	Ser	245	250	255	
Asp	Ala	Phe	Met	Val	Ala	Arg	Gly	Asp	Leu	Gly	Met	Glu	Ile	Pro	Ile	260	265	270	
Glu	Lys	Ile	Phe	Phe	Ala	Gln	Lys	Val	Met	Ile	Phe	Lys	Cys	Asn	Ile	275	280	285	
Gln	Gly	Lys	Pro	Val	Val	Thr	Ala	Thr	Gln	Met	Leu	Glu	Ser	Met	Ile	290	295	300	
Lys	Ser	Pro	Arg	Pro	Thr	Arg	Ala	Glu	Ala	Thr	Asp	Val	Ala	Asn	Ala	305	310	315	320

Val Leu Asp Gly Thr Asp Cys Val Met Leu Ser Gly Glu Thr Ala Ala  
325 330 335

Gly Ala Tyr Pro Gly Leu Ala Val Gln Thr Met Ala Lys Ile Cys Leu  
340 345 350

Gln Ala Glu Ser Cys Val Asp His Ala Ala Ile Phe Lys Ser Ile Met  
355 360 365

Ala Ser Ala Pro Ile Pro Met Ser Pro Leu Glu Ser Leu Ala Ser Ser  
370 375 380

Ala Val Arg Thr Ala Asn Ser Ala Arg Ala Ala Leu Ile Leu Val Leu  
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Thr Arg Gly Gly Thr Thr Ala Arg Leu Val Ala Lys Tyr Arg Pro Ser  
405 410 415

Met Pro Ile Leu Ser Val Val Val Pro Glu Leu Lys Thr Asp Ser Phe  
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Asp Trp Ala Cys Ser Asp Glu Gly Pro Ala Arg His Ser Leu Ile Val  
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Arg Gly Val Ile Pro Met Leu Ser Ala Ala Thr Ala Lys Ala Phe Asp  
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Asn Glu Ala Thr Asp Glu Ala Ile Gly Phe Ala Ile Glu Asn Ala Lys  
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Met Ala Asn Ile Asp Met Ala Lys Ile Leu Ala  
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gac ctg gac cgc ggc gcc ggc gac gcg cgg ctg ccc aag acc aag ctc 278  
Asp Leu Asp Arg Gly Ala Gly Asp Ala Arg Leu Pro Lys Thr Lys Leu  
15 20 25  
gtc tgc acg ctt ggc ccg gcc tcc cgc tcc gtg ccc atg ctc gag aag 326  
Val Cys Thr Leu Gly Pro Ala Ser Arg Ser Val Pro Met Leu Glu Lys  
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ctg ctc cgc gcc ggc atg aac gtc gcg cgc ttc aac ttc tcc cac ggc 374  
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45 50 55  
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Thr His Gln Tyr His Gln Glu Thr Leu Asp Ser Leu Arg Gln Ala Met  
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His Asn Thr Gly Ile Leu Cys Ala Val Met Leu Asp Thr Lys Gly Pro  
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Glu Ile Arg Thr Gly Phe Leu Lys Asp Gly Lys Pro Ile Lys Leu Thr  
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Lys Gly Gln Glu Ile Thr Val Thr Thr Asp Tyr Asp Ile Lys Gly Asp  
110 115 120  
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Glu Lys Met Ile Ala Met Ser Tyr Lys Lys Leu Pro Val Asp Val Lys  
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Pro Gly Asn Val Ile Leu Cys Ala Asp Gly Thr Ile Ser Leu Ala Val  
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Leu	Ser	Cys	Asp	Pro	Asp	Ala	Gly	Thr	Val	Arg	Cys	Arg	Cys	Glu	Asn	
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act	gca	atg	ctt	ggt	gag	aga	aag	aac	tgc	aat	ttg	cca	gga	att	gtt	758
Thr	Ala	Met	Leu	Gly	Glu	Arg	Lys	Asn	Cys	Asn	Leu	Pro	Gly	Ile	Val	
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gtg	gat	ctt	cct	aca	ttg	act	gag	aaa	gat	aaa	gaa	gat	att	ttg	ggc	806
Val	Asp	Leu	Pro	Thr	Leu	Thr	Glu	Lys	Asp	Lys	Glu	Asp	Ile	Leu	Gly	
		190					195					200				
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Trp	Gly	Val	Pro	Asn	Asp	Ile	Asp	Met	Ile	Ala	Leu	Ser	Phe	Val	Arg	
	205					210					215					
aaa	gga	tca	gat	ttg	gtg	act	gtc	aga	cag	gtt	ctt	ggg	cag	cat	gcc	902
Lys	Gly	Ser	Asp	Leu	Val	Thr	Val	Arg	Gln	Val	Leu	Gly	Gln	His	Ala	
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Lys	Arg	Ile	Lys	Leu	Met	Ser	Lys	Val	Glu	Asn	Gln	Glu	Gly	Val	Val	
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aac	ttt	gat	gag	atc	ttg	agg	gag	act	gat	gct	ttt	atg	gtt	gct	aga	998
Asn	Phe	Asp	Glu	Ile	Leu	Arg	Glu	Thr	Asp	Ala	Phe	Met	Val	Ala	Arg	
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Lys	Met	Met	Ile	Tyr	Lys	Cys	Asn	Ile	Ala	Gly	Lys	Pro	Val	Val	Thr	
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gct	acc	cag	atg	ctc	gag	tcg	atg	atc	aaa	tct	cct	cgg	ccg	aca	cgt	1142
Ala	Thr	Gln	Met	Leu	Glu	Ser	Met	Ile	Lys	Ser	Pro	Arg	Pro	Thr	Arg	
300				305					310						315	
gct	gag	gcc	act	gac	gtt	gca	aat	gcc	gtt	ctt	gat	gga	act	gac	tgt	1190
Ala	Glu	Ala	Thr	Asp	Val	Ala	Asn	Ala	Val	Leu	Asp	Gly	Thr	Asp	Cys	
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gtc	atg	ctc	agc	gga	gag	agt	gcc	gct	gga	gcc	tac	ccc	gag	gtg	gct	1238
Val	Met	Leu	Ser	Gly	Glu	Ser	Ala	Ala	Gly	Ala	Tyr	Pro	Glu	Val	Ala	
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gtg	aag	atc	atg	gct	cgt	att	tgc	atc	gag	gca	gaa	tct	tcc	ctg	gac	1286

Val	Lys	Ile	Met	Ala	Arg	Ile	Cys	Ile	Glu	Ala	Glu	Ser	Ser	Leu	Asp	
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cac	gag	gca	gtt	ttc	aag	gcc	atg	atc	agg	tcc	gcg	cct	ctt	cca	atg	1334
His	Glu	Ala	Val	Phe	Lys	Ala	Met	Ile	Arg	Ser	Ala	Pro	Leu	Pro	Met	
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agc	cct	ctg	gag	tcc	ctt	gca	tca	tct	gct	gtg	agg	act	gcc	aac	aag	1382
Ser	Pro	Leu	Glu	Ser	Leu	Ala	Ser	Ser	Ala	Val	Arg	Thr	Ala	Asn	Lys	
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gcc	aag	gct	gca	ctg	att	gtc	gtc	ctg	act	cgc	ggg	ggc	acc	acg	gcc	1430
Ala	Lys	Ala	Ala	Leu	Ile	Val	Val	Leu	Thr	Arg	Gly	Gly	Thr	Thr	Ala	
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aaa	ctg	gtc	gcc	aag	tac	cgc	ccc	agg	gtc	ccc	atc	ctc	tcc	gtt	gtc	1478
Lys	Leu	Val	Ala	Lys	Tyr	Arg	Pro	Arg	Val	Pro	Ile	Leu	Ser	Val	Val	
			415					420					425			
gta	ccc	gtg	ctt	acg	acc	gac	tct	ttc	gac	tgg	acc	atc	agc	tcc	gag	1526
Val	Pro	Val	Leu	Thr	Thr	Asp	Ser	Phe	Asp	Trp	Thr	Ile	Ser	Ser	Glu	
			430					435					440			
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Gly	Pro	Ala	Arg	His	Ser	Leu	Ile	Tyr	Arg	Gly	Leu	Ile	Pro	Leu	Leu	
			445				450				455					
gcc	gag	ggc	tcc	gcg	aag	gct	acg	gat	tca	gag	tcg	acg	gag	gtg	atc	1622
Ala	Glu	Gly	Ser	Ala	Lys	Ala	Thr	Asp	Ser	Glu	Ser	Thr	Glu	Val	Ile	
			460				465				470				475	
ctt	gag	gcc	gcg	ttg	aag	tcg	gcc	gtg	cag	aag	cag	ctc	tgc	aag	cct	1670
Leu	Glu	Ala	Ala	Leu	Lys	Ser	Ala	Val	Gln	Lys	Gln	Leu	Cys	Lys	Pro	
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ggg	gat	gcc	atc	gtg	gct	ctt	cat	cgt	att	ggc	gtc	gcc	tcc	gtc	atc	1718
Gly	Asp	Ala	Ile	Val	Ala	Leu	His	Arg	Ile	Gly	Val	Ala	Ser	Val	Ile	
			495					500					505			
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Lys	Ile	Cys	Ile	Val	Lys											
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35 40 45

Met Asn Val Ala Arg Phe Asn Phe Ser His Gly Thr His Gln Tyr His  
50 55 60

Gln Glu Thr Leu Asp Ser Leu Arg Gln Ala Met His Asn Thr Gly Ile  
65 70 75 80

Leu Cys Ala Val Met Leu Asp Thr Lys Gly Pro Glu Ile Arg Thr Gly  
85 90 95

Phe Leu Lys Asp Gly Lys Pro Ile Lys Leu Thr Lys Gly Gln Glu Ile  
100 105 110

Thr Val Thr Thr Asp Tyr Asp Ile Lys Gly Asp Glu Lys Met Ile Ala  
115 120 125

Met Ser Tyr Lys Lys Leu Pro Val Asp Val Lys Pro Gly Asn Val Ile  
130 135 140

Leu Cys Ala Asp Gly Thr Ile Ser Leu Ala Val Leu Ser Cys Asp Pro  
145 150 155 160

Asp Ala Gly Thr Val Arg Cys Arg Cys Glu Asn Thr Ala Met Leu Gly  
165 170 175

Glu Arg Lys Asn Cys Asn Leu Pro Gly Ile Val Val Asp Leu Pro Thr



435		440		445
Ser Leu Ile Tyr Arg Gly Leu Ile Pro Leu Leu Ala Glu Gly Ser Ala				
450		455		460
Lys Ala Thr Asp Ser Glu Ser Thr Glu Val Ile Leu Glu Ala Ala Leu				
465		470		475
				480
Lys Ser Ala Val Gln Lys Gln Leu Cys Lys Pro Gly Asp Ala Ile Val				
	485		490	495
Ala Leu His Arg Ile Gly Val Ala Ser Val Ile Lys Ile Cys Ile Val				
	500		505	510
Lys				